rapidly emerged as a major cause of bloody diarrhea and acute renal failure. The infection is sometimes fatal, particularly in children. Outbreaks of infection, generally associated with beef, have been reported in the United States, Australia, Canada, Japan, the European countries, and in southern Africa.

Why are foodborne diseases emerging, and why now? We have all been made aware of the possibility of travelers, refugees, and immigrants bringing unfamiliar foodborne hazards into the United States, but there are other less well-publicized reasons as well.

The globalization of the food supply has meant that a contaminated lettuce imported from southern Europe was able to cause a large outbreak of *Shigella sonnei* infection in Great Britain, Norway, and Sweden in 1994.

Pathogens have been inadvertently introduced into new geographic areas, as was the case in 1991 when *Vibrio cholerae* was introduced into the waters off the coast of the southern United States after a cargo ship discharged contaminated ballast water.

Changes in microbial populations can lead to the evolution of new pathogens, the development of new virulent strains in old pathogens, the development of antibiotic resistance that might make a disease more difficult to treat, or to changes in the microbes' ability to survive under adverse environmental conditions.

And once again, the aging of our population plays a role. Foodborne infections are more likely to invade the blood stream and lead to severe illness with a high mortality rate in older people. In fact, those at the extremes of age have either not developed or have partially lost immune protection from infection.

In addition, people with weakened immune systems can become infected with foodborne pathogens at low doses that may not produce an adverse reaction in healthy people.

Finally, greater numbers of people than ever before eat prepared meals sold by stores, restaurants, canteens, fast food outlets, and street food vendors. The effects of unhygienic preparation of food is amplified when food is prepared and sold in large quantities.

The control of foodborne diseases requires a concerted effort on the part of governments, the food industry, and consumers.

Kim Robbie/The Stock Market

WHO has issued The 10 Golden Rules for Safe Food Preparation *and a guide on* Safe Food for Travelers. *For further information, please contact Valery Abramov, Health Communication and Public Relations, WHO, Geneva, Switzerland; tel. 4122-791-2543; fax 4122-791-4858.*

Immunization of Adolescents

Institute a routine check-up for 11- to-12-year-olds and immunize adolescents? Here are the reasons:

- In the United States, most people infected with **hepatitis B** virus acquired their infection as young adults or adolescents, through sexual contact, injection drug use, or routine contact with an infected person while the source of fully one-third of infections remains unknown.
- The decline in **measles** has been associated with a shift in occurrence from children to infants and young adults. During 1990–1994, 47% of reported cases occurred in people older than 9, compared with only 10% during 1960–1964.
- Although booster doses of **tetanus and diphtheria** toxoids are recommended at 10-year intervals, there has been no strategy to ensure implementation. Diphtheria has reemerged and an epidemic developed in the New Independent States (NIS) of the former Soviet Union, resulting in more than 47,000 cases reported in 1994 and more than 50,000 in 1995. While no infected individuals made their way to the United States, more than 20 cases were reported in Europe. The United States needs to maintain high levels of immunity to these dis-

eases in its population.

- The rate of complications, including death, is greater for people who contract **chickenpox** when they are older than 15. This leaves the approximately 20% of adolescents ages 11–12 years who have not yet had chickenpox at risk.

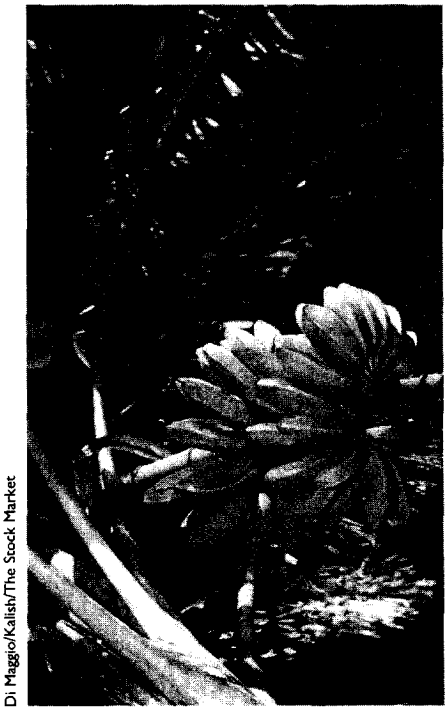
In light of the above, the Centers for Disease Control and Prevention has released *Immunization of Adolescents: Recommendations of the Advisory Committee on Immunization Practices, the American Academy of Pediatrics, the American Academy of Family Physicians, and the American Medical Association* which can be found in *Morbidity and Mortality Weekly Report* 1996; 45(No. RR-13). The announcement summarizes:

> This new strategy emphasizes vaccination of adolescent 11–12 years of age by establishing a routine visit to their health care providers. Specifically, the purposes of this visit are to *(a)* vaccinate adolescents who have not been previously vaccinated with varicella virus vaccine, hepatitis B vaccine, or the second dose of the measles, mumps, and rubella vaccine; *(b)* provide a booster dose of tetanus and diphtheria toxoids; *(c)* administer other recommended preventive services.

Copies of the recommendations can be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington DC; tel. 202-783-3238.

Banana Vaccines and Other Developments —The Jordan Report

Bananas are the best food choice for an edible vaccine—a wonderful idea that is no longer in the realm of dreams but on the move toward reality. In the chapter "Edible Vaccines Produced in Transgenic Plants" from *The Jordan Report: Accelerated Development of Vaccines 1996*, Charles J. Arntzen notes that the banana crop has "three major attributes: it is grown in almost all tropical or subtropical developing countries...; the food is eaten uncooked (which would avoid denaturation of subunit proteins); and bananas are a food that is widely consumed by infants or children. At the present time we have developed a methodology for the genetic transformation of bananas and are cloning fruit-specific genetic regulatory elements which we believe will cause the tissue-specific production of the desired candidate vaccine in the developing fruit."



Di Maggio/Kalish/The Stock Market

Other chapters (each written by different authors) cover a range of topics: Vaccines and Public Health, Meeting the Challenge of Emerging Infectious Diseases, Pertussis Vaccines, Approaches for Generating Mucosal Immunity, the Challenge of Vaccinating the Elderly, Progress in the War on Tuberculosis, and Prospects for Development of a DNA Vaccine.

Copies of The Jordan Report *are available from Philip J. Baker, PhD, Program Officer, Lyme Disease Program, Division of Microbiology & Infectious Disease, NIH, Solar Building, Room 3A05, MS 7630, Bethesda MD 20892-7630; e-mail <pbaker@mercury.niaid.nih.gov>.*

1996 Albert Lasker Medical Research Award

The Albert Lasker Research Awards are considered the most prestigious medical research honor in American science. This year's Clinical Medical Research Award goes to four scientists who developed a novel vaccine that has virtually eradicated significant illness and high morbidity from *Haemophilus influenza*, type B (Hib), a bacteria that was a major cause of serious infections such as meningitis in infants and children.

The four scientists are John Robbins, MD, Rachel Schneerson, MD, both from the National Institutes of Health, Bethesda, MD; Porter Anderson, PhD, from North Miami Beach, FL; and David H. Smith, MD, from the David Hamilton Smith Foundation in New York City.

Prior to their development of the vaccine, the incidence of Hib infections was estimated to be 1 out of 250 children in the United States—similar to that of paralytic polio prior to the availability and use of polio vaccine. Five percent of patients died and 30% had permanent injury to the central nervous system—making Hib meningitis the leading cause of acquired mental retardation.

The four scientists' pioneering work on vaccine development over the past 28 years has resulted in new immunologic principles that have been successfully applied to other diseases and to vaccine development in general.

In the October 9, 1996, issue of the *Journal of the American Medical Association*, the four scientists write: "We suggest that an important implication for development of new vaccines is that attention should be directed primarily to the initial host interaction and not to the symptoms of disease."